{REDACTED} Cardiovascular Regenerative Team

Grant Award Details

{REDACTED} Cardiovascular Regenerative Team

Grant Type: Disease Team Planning

Grant Number: DT1-00710

Investigator:

Name:	Robert Robbins
Institution:	Stanford University
Type:	PI

Award Value: $25,119

Status: Closed

Grant Application Details

Application Title: {REDACTED} Cardiovascular Regenerative Team

Public Abstract:

Heart failure affects 5 million patients in the U.S., representing the most common cause of hospital admission and resulting in 300,000 deaths annually. Despite aggressive treatment with advanced pharmacotherapies and implantable devices, the 5-year survival is only 50%. Cardiac transplantation is limited to 2,000 patients per year due to the lack of suitable donors. Therefore, a strong mandate exists for novel strategies to treat patients with end-stage heart failure. Recent investigations support cell therapy as a rational strategy to restore and regenerate the injured myocardium. However, clinical studies suggest that adult stem cell therapy provides only limited efficacy. The {REDACTED} Cardiovascular program has a distinguished history that includes several firsts in transplantation and implantation: the first human heart and heart-lung transplants in the US and first human endovascular stent-graft for aortic aneurysm. The {REDACTED} Cardiovascular Regenerative Team follows this tradition of translational research to focus on efficient, integrated collaboration across multiple disciplines within {REDACTED} and to accelerate clinical implementation of innovative ideas by fostering partnership between academia and industry. For the CIRM Disease Team grant, the {REDACTED} proposes to directly test the utility of human embryonic stem cell (hESC)-based therapy for significant and sustained functional restoration of injured myocardium. Our approach is grounded in fundamental investigations performed by the team members. We propose a collaborative strategy based on novel discoveries in our laboratories that will culminate in the first Phase I safety trial of transplantation of hESC-derived cardiovascular stem cells for patients with end-stage heart failure. The specific aims are: 1) Derive clinical-grade hESCs using good manufacturing practice (GMP). 2) Differentiate, purify and characterize mesodermal cells for cardiovascular regeneration. 3) Deliver and monitor hESCs in large animal model. 4) Transplant GMP-hESC derived progenitor cells into the failing heart of patients awaiting heart transplantation.

The planning effort of {REDACTED} will merge innovative approaches in human stem cell biology with the highest standards in clinical safety to address a fundamental yet very critical issue in translational research: safety of GMP-hESC derived progenitor cells in the patients with failing heart.

Statement of Benefit to California:

Coronary artery disease continues to be the leading cause of death in the United States. Recent advances in cardiovascular therapy have improved immediate survival following an acute myocardial infarction (heart attack or arrest). The persistence of high overall mortality of coronary artery disease despite improved treatment is due to a shift in the disease process. Studies have demonstrated a critical role of the infarcted myocardium in the development of congestive heart failure (a common form of progressive heart failure). Indeed, the incidence of congestive heart failure is now reaching epidemic proportions. Today, there are more deaths from patients developing congestive heart failure than those sustaining acute myocardial infarction. Congestive heart failure is the leading cause of hospital admissions resulting in approximately 300,000 deaths annually. There are nearly 5 million Americans who are suffering from this illness with 550,000 new cases reported each year. Over the last several decades, advances in biomedical technology provided significant improvement in morbidity and mortality. Unfortunately, however, the average 5-year survival today still remains around a dismal 50%, creating a major public health concern. Heart transplantation is an established treatment for end-stage congestive heart failure. Yet, this definitive therapy is limited to only 2000 donor hearts per year. Thus, a strong mandate exists for an alternative therapeutic option. Human embryonic stem cells (hESC) have demonstrated the ability to differentiate into cardiac cells, representing a potential application of cell therapy to restore the injured myocardium.

It is notable that the public health impact of congestive heart failure in California is representative of the emerging epidemic seen across the United States. As the most populous State in the nation, congestive heart failure has resulted in an equivalent health care burden to California citizens in terms of financial cost, morbidity and mortality. The State of California stands to benefit tremendously with scientifically proven safe and definitive therapy for congestive heart failure using hESC.

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